

APPLIED FORESTRY NOTES

U. S. Forest Service
District 1

(Not for Publication)

Devoted to disseminating the results of forest investigations applicable in Montana and northern Idaho, including investigations by research and administrative men of the Forest Service, by co-operative bureaus and by field men. Address the Director, Priest River Experiment Station, Missoula, Montana.

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IN EXPLANATION

Although it has been the custom for "Applied Forestry Notes" to appear without reference to a definite schedule, its readers may have noticed a longer interval between issues than usual. Its last appearance, in fact, was at the end of July. At that time the editor and founder, Forest Examiner Lowdermilk, resigned from the Forest Service to accept a position in China. With this issue the responsibility for the paper is taken over by the Priest River Experiment Station. As in the past, its pages in the future will always be open to the results of all forest investigations, whether they be the slash disposal studies of the timber sale man or the more fundamental investigations of the Research man.

R. H. Weidman

WEATHER RECORDS APPLIED TO THE FIRE PROBLEM

By H. T. Gisborne

Forest Examiner.

In the preparation of annual fire reports it is often valuable to compare the number, average size and cost of the fires during the year with the average of previous years. In a similar manner the average weather for one season may be compared to the average for previous seasons and the fact may be brought out that the fire record has been improved in spite of more dangerous weather than usual. A consideration of the weather conditions within a single season may also show the reasons for certain fire short periods of exceptionally large and expensive fires. The report, by itself, does not ordinarily bring out these elements

which the Forest Service has had to fight against during the season.

Tabulations of weather conditions can be prepared by practically every Forest in this District whether or not there is a weather station within the Forest itself. In nearly all cases there is a full-fledged or cooperative Weather Bureau station not far from the Forest whose records will show the variations in weather from one period to another. Although these records may not show values equal to those obtainable within the Forest still the fluctuations from period to period will undoubtedly be comparable if the recording station is not on the opposite side of some topographic feature such as a pronounced desert or mountain range which acts as a climatic control or barrier.

Copies of the records from all U. S. Weather Bureau stations can be obtained by request from the office in charge of each state. For this District these offices are at Helena, Montana; Boise, Idaho, and Seattle, Washington. Monthly summaries are obtainable which show the precipitation, the maximum and the minimum temperatures for each day at each field station by states.

In tabulating the data to bring out the facts of interest there are several points to be considered. First, the records for the season under study. Second, the records for the preceding five or ten seasons which will supply an average for comparative purposes. Third, the length of the periods to be shown separately. Ten-day periods are recommended since these coincide with the system used in fire reports, also because these short periods bring out very important fluctuations of the weather which are not shown by monthly averages. Fourth, the class of data to be utilized. Precipitation is absolutely necessary; there are, however, three possibilities of using the temperature. The maximum, the minimum and the mean may all be shown if desired, but the maximum seems to have the greatest importance and significance. It has been found, at the Priest River Experiment Station, that evaporation, from Forest Service evaporimeters, fluctuates in noticeable agreement with maximum temperature. Furthermore, the wind velocity is usually highest during the hottest part of the day. As the maximum temperature indicates the heat in the air at the hottest part of the day, and as fires will spread most rapidly with the highest wind velocity, this seems to be a better criterion of fire danger than the temperature at any other time. Inclusion of the minimum and mean temperatures merely serves to confuse the perspective of the situation. When the 10-day averages have been obtained for a period of seasons prior to and inclusive of 1921 they should be plotted on cross section paper. The 10-day averages for the 1922 season should then be plotted, in different colored ink, on the same sheet and the variations within the season and for the season as a whole will become evident.

The weather records obtained at the Priest River Experiment Station have been compiled in accordance with the above described procedure. From this compilation it was found that, of the twelve 10-day periods included between June 1 and October 1, 1922, ten periods were warmer and only two were cooler than the averages of the same periods during the six preceding years. In other words, over 80% of the season had an average maximum temperature higher than normal. Eight out of these twelve periods had less precipitation than the averages for the same periods. In other words, there was a relative drought for 66% of the season. The degree of this drought is emphasized by the fact that two successive periods and a total of four periods had no precipitation whatever during the past season whereas the average season shows only one 10-day period with a total of 0.10 inches rainfall as the driest part of the season. Furthermore, the average season shows only two consecutive periods with less than 0.40 inches precipitation per period, whereas during 1922 there were eleven consecutive periods, from May 11 to September 1 inclusive, without 0.40 inches of rain in any one period.

Comparing the various periods within the 1922 season it is found that August 1 to 10 experienced the highest average maximum temperature. This period was undoubtedly the peak of the season at the Priest River Station. It was preceded by two periods having no rainfall whatever and only 0.03 inches arrived at the very end of this period itself. The number of fires in the surrounding forest also reached a peak in the two periods between July 20 and August 10.

Many other facts of interest can be developed by tabulations of simple weather data as outlined above. Their value, however, lies in a correlation of these facts to the records of fires during the same periods. In some cases the weather data may explain the presence of numerous and large fires, in other cases the weather data may indicate the advisability of investigating other sources of information such as incendiarism, laxity of organization, or some other unexpected but active factor whose results have been previously charged against the weather. Such tabulations may also help to bring out the results of improvements in organization and fire fighting methods by demonstrating a smaller number and size of fires during a year of more dangerous weather than the average.

The years 1910 and 1919 are recognized as having been the most dangerous since the organization of the Forest Service. Mr. Flint has found that, of all the area in District 1 burned over from 1908 to 1921 inclusive, 86.7 per cent was burned during the two years 1910 and 1919, while only 13.3 per cent was burned during the other twelve years. Comparable weather records are not readily available for 1910, but for June, July and August, 1919, for the whole states of Montana and Idaho, the average monthly mean temperature was 2.7 degrees above normal while the average monthly total precipitation was 0.91 inches less than normal. For the same regions and months during 1922 the average monthly mean

temperature was 2.35 degrees above normal, and the precipitation 0.13 inches above. Idaho, alone, experienced a deficiency of rainfall during June and July, 1922. It is evident that, for the District as a whole, the 1922 fire season was nearly as warm as the 1919 season. Precipitation was evidently the factor which, together with better fire protection, prevented a recurrence of a peak of danger similar to that of 1919.

Under these conditions during 1922 the Forests of District 1 have decreased the size and cost of the average fire while the number of fires handled increased about seven per cent. Some Forests undoubtedly established good records in spite of weather conditions more unfavorable than usual. It remains for these Forests to show to what the credit is due.